CLAIMS

1. A video encoder (200, 300) for encoding video signal data for at least one cross-fade picture disposed temporally between a fade-out start picture and a fade-in end picture, which are used as reference pictures for coding the at least one cross-fade picture, the encoder comprising:

a reference picture weighting applicator (292, 392); and

a reference picture weighting factor unit (272, 372) in signal communication with the reference picture weighting applicator for assigning weighting factors corresponding to each of the fade-out start picture and the fade-in end picture, respectively, for coding the at least one cross-fade picture.

2. A video encoder as defined in Claim 1, further comprising a motion compensation unit (290, 390) in signal communication with the reference picture weighting applicator for providing at least one of a motion compensated fade-out start picture and a motion compensated fade-in end picture responsive to the reference picture weighting factor unit for coding the at least one cross-fade picture.

3. A video encoder as defined in Claim 2, further comprising a reference picture store (270, 370) in signal communication with each of the reference picture weighting factor unit and the motion compensation unit for storing each of the fade-out start picture and the fade-in end picture.

4. A video encoder as defined in Claim 2 wherein the reference picture weighting applicator applies a weighting factor selected by the reference picture weighting factor unit to at least one of the motion compensated fade-out start picture and the motion compensated fade-in end picture.

5. A video encoder as defined in Claim 4 usable with bi-predictive picture predictors, the encoder further comprising prediction means for forming first and second predictors from the weighted and motion compensated fade-out start and fade-in end pictures, respectively.

6. A video encoder as defined in Claim 5 wherein the weighted and motion compensated fade-out start and fade-in end pictures, respectively, are each from opposite directions relative to all of the at least one cross-fade pictures.

7. A video encoder as defined in Claim 1, further comprising a motion estimation unit (380) in signal communication with the reference picture weighting factor unit for providing motion estimation responsive to weighting factor in an explicit mode of operation.

8. A video encoder as defined in Claim 2, further comprising a summing unit (394) in signal communication with the reference picture weighting factor unit for applying an offset to the weighted motion compensated reference picture in an explicit mode of operation.

9. A method (700) for encoding cross-fades between pictures, the method comprising:

identifying pictures for which a cross-fade is defined;

determining (714,716) appropriate end-points from pictures for which said cross-fade is defined; and

encoding (718,720) said end-points prior to encoding (722) at least one picture intermediate to said end-points.

10. A method as defined in Claim 9 wherein said end-points from pictures for which said cross-fade is defined are used as reference pictures when encoding at least one picture intermediate to said end-points.

11. A method as defined in Claim 9, further comprising:

receiving a substantially uncompressed fade-out start picture; receiving a substantially uncompressed fade-in end picture;

assigning a weighting factor for the at least one - picture corresponding to the fade-out start picture; and

assigning a weighting factor for the at least one - picture corresponding to the fade-in end picture.

12. A method as defined in Claim 11, further comprising:

computing motion vectors corresponding to the difference between the at least one cross-fade picture and at least one of the fade-out start picture and the fade-in end picture;

motion compensating the at least one of the fade-out start picture and the fade-in end picture in correspondence with the motion vectors;

multiplying the motion compensated at least one of the fade-out start picture and the fade-in end picture by the assigned weighting factor, respectively, to form at least one weighted motion compensated reference picture; and

subtracting the at least one weighted motion compensated reference picture from the at least one cross-fade picture; and encoding a signal indicative of the difference between the at least one cross-fade picture and the at least one weighted motion compensated reference picture.

13. A method as defined in Claim 12 wherein exactly two reference pictures are used, the exactly two reference pictures comprising the pre-coded fade-out start picture, FP0, and the fade-in end picture, FP1.

14. A method as defined in Claim 13, further comprising:

combining the motion compensated fade-out start picture with the motion compensated fade-in end picture prior to subtracting from the at least one cross-fade picture.

15. A method as defined in Claim 12 wherein computing motion vectors comprises:

testing within a search region for every displacement within a pre-determined range of offsets relative to the at least one cross-fade picture;

calculating at least one of the sum of the absolute difference and the mean squared error of each pixel in the at least one cross-fade picture with a motion compensated reference picture; and

selecting the offset with the lowest sum of the absolute difference and mean squared error as the motion vector.

16. A method as defined in Claim 12 wherein computing motion vectors comprises:

testing within a search region for every displacement within a pre-determined range of offsets relative to the at least one cross-fade picture;

calculating at least one of the sum of the absolute difference and the mean squared error of each pixel in the at least one cross-fade picture with a first motion compensated reference picture corresponding to the fade-out start picture;

selecting an offset with the lowest sum of the absolute difference and mean squared error as the motion vector for the fade-out start picture;

calculating at least one of the sum of the absolute difference and the mean squared error of each pixel in the image block with a second motion compensated reference picture corresponding to the fade-in end picture; and

selecting an offset with the lowest sum of the absolute difference and mean squared error as the motion vector for the fade-in end picture.

17. A method as defined in Claim 11 wherein the weighting factors for the fade-out start picture and the fade-in end picture, respectively, are each responsive to the relative distance between the at least one cross-fade picture and the fade-out start picture or the fade-in end picture, respectively, in an implicit mode of operation.

18. A video CODEC comprising an encoder as defined in Claim 1 and a decoder (500) for decoding video signal data for a cross-fade picture relative to each of a fade-out start picture and a fade-in end picture to predict the cross-fade picture, the decoder comprising a reference picture weighting factor unit (580) having an output for determining weighting factors corresponding to each of the fade-out start picture and the fade-in end picture.

19. A video CODEC as defined in Claim 18 wherein the reference picture weighting factor unit has a second output for determining offsets corresponding to each of the fade-out start picture and the fade-in end picture.

20. A video CODEC as defined in Claim 18, further comprising a variable length decoder (510) in signal communication with the reference picture weighting factor unit for providing indices corresponding to each of the fade-out start picture and the fade-in end picture to the reference picture weighting factor unit.

21. A video CODEC as defined in Claim 18, further comprising a motion compensator (560) in signal communication with the reference picture weighting factor unit for providing motion compensated reference pictures responsive to the reference picture weighting factor unit.

22. A video CODEC as defined in Claim 21, further comprising a reference picture weighting applicator (570) in signal communication with the motion compensator and the reference picture weighting factor unit for applying a weighting factor to each motion compensated reference picture.

23. A video CODEC as defined in Claim 21, further comprising an adder (590) in signal communication with the motion compensator and the reference picture weighting factor unit for applying an offset to each motion compensated reference picture.

24. A video CODEC as defined in Claim 18 wherein the video signal data is streaming video signal data comprising block transform coefficients.

25. A video CODEC as defined in Claim 18 usable with bi-predictive picture predictors, the decoder further comprising:

prediction means for forming first and second predictors from two different reference pictures;

averaging means for averaging the first and second predictors together using their corresponding weighting factors to form a single averaged predictor.